

# ***Proposal for Roadmap for ILC Detectors***

## **Introduction**

The ILC GDE plans to produce an EDR (Engineering Design Report) document by 2010. This document will serve as the basis for getting the ILC approved by the governments. It is essential that the ILC detectors are part of this approval phase and therefore the ILCSC and ICFA have asked the WWS co-chairs to implement a roadmap plan for producing 2 EDR documents for the two detectors planned for the ILC. The detector EDRs would be produced in 2010 in parallel with the machine EDR. The reason for synchronization with the machine EDR timeline is not only political but also corresponds to the construction plans for the ILC with the aim of full commissioning of the machine and the detectors 7 years after the start of construction. In this plan the surface assembly of the detectors would start 2 years after time zero and would take no longer than 5 years prior to installation in the experimental hall. Any delay with respect to this schedule would result in an overall delay of the project.

It is clear that by 2010 it will not be possible to produce 'ready for construction' EDRs for either the machine or for the detectors. From the detector perspective there are two main reasons for this. Firstly, the ongoing R&D programme for the sub-detector systems will not have reached completion; it will not be possible to finalise the choice of detector technology to the point where it would be possible to commence construction. Secondly, over the next few years the available resources will not be sufficient to produce a full EDR. Additional resources and time will therefore be needed to produce 'ready for construction' EDRs. We think that the R&D program and the EDR document can be completed during the period of delicate inter-governmental negotiations which will be needed for the three regions to agree on the siting the ILC and the sharing of effort.

## **The organisation of the roadmap**

The ILC community should aim at writing two detector EDR documents by 2010. Limiting the number of EDRs to two may seem incompatible with the free and open approach traditional for the design of collider detectors. The reason for this restriction is that until 2010 the ILC detector community will be putting the majority of its resources, both manpower and money, into the R&D activities. We believe that there will not be sufficient additional resources to prepare more than two EDR documents. Similar reasoning led to the ITRP choice of one technology for the machine. It is also worth recalling that for the LHC detectors there was also a phase of merging of the proto-collaborations.

The EDRs produced in 2010 must capture costs and proposed concepts reliably, but they will not be complete in detail. In particular, it is most unlikely that firm decisions on all the sub-detector technologies could be made by 2010. Promising technologies which are still too immature for present inclusion in the EDRs should be included as options. The two EDR detector designs could therefore include a set of possible choices of sub-detectors where alternative solutions are presently being considered.

An important question is how we arrive at the choices for the two detector EDRs in a transparent manner and without imposing a priori constraints on the community. The WWS proposes that we go through the standard procedure of a LOI (Letter of Intent) to be sent to ILCSC/ICFA by the middle of 2008. To avoid duplication of effort, the LOIs would be supported by detailed documents which, for example, could be updated versions of existing Detector Outline Documents (DOD).

The LOIs would be reviewed by a new body, IDAG (International Advisory Detector Group) which will comprise of members nominated by the ILCSC. The mission of the IDAG would be to consider the LOIs and, based on a thorough understanding of the status of the R&D effort, to organize the ILC detector community into collaborations which would produce two EDRs by 2010. The WWS will propose the charge for IDAG to the ILCSC.

We believe that IDAG cannot achieve its goals alone; it will not be a permanent body and it would lack the executive power needed both to implement its recommendations and to interact with the various groups and funding authorities. We therefore recommend that the ILCSC nominates a Research Director for ILC detectors. The Research director would work full time with a team. This structure of the team working under the Research Director needs to be defined, although this could start from the present ILC detector structure set by the WWS. The charge of the Research Director also needs to be defined, however, we believe that he/she should be nominated by ILCSC/ICFA and that he/she would interact closely with the GDE. Eventually the ILCSC would propose an 'umbrella' organisation grouping the GDE and the detector activities; at the moment we believe that its role is to ensure a viable structure for the detector activities.

## **What is an EDR?**

The WWS co-chairs have started to look into this question with a working group made up of 2 representatives from each detector concept plus Chris Damerell representing the R&D effort. In short, we believe that in the first phase, an EDR should provide a detailed implementation for the integration of the various sub-detectors, defining the interfaces, supports, cabling, electronics and cooling. This will provide a detailed understanding of the material distribution required for the development of realistic detector simulation and reconstruction. Dealing with the MDI aspects of the detector is also essential; this is already apparent from the ongoing push-pull discussions. In addition, an EDR would provide a reliable costing at the level of better than say 20%. To produce an EDR by 2010 we believe that the extra resources required are mainly full time manpower and that the cost of these additional resources will not exceed a few per cent of the cost of the detector.

## **What is an LOI?**

An LOI should present a team of laboratories and research groups able to provide an EDR in 2010 under the conditions described above. The resources needed to fulfil the EDR work until 2010 should be clearly committed through inter-laboratories Memoranda of Understanding (MoUs). A LOI could be a short document backed up by a detailed report which could be an updated version of a DOD prepared within a concept. Newcomers are of course welcome but, in practice, would need to collaborate with groups already active in the preparation for the ILC.

## **Purpose of the web FORUM**

The web forum will allow a debate to take place in preparation for the plenary session discussing the roadmap which will take place at LCWS07. You are encouraged to write down your questions, opinions and suggestions to help us reach the largest consensus on the proposed organization.